## Space Weather Forecast

Issued on Friday, 16 December 2022 at 12:21 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Further Moderate class flares likely from the Active sunspot in the southwest.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar Activity has been Moderate with numerous moderate-class flares observed in the last 24 hours, mainly from the active sunspot in the southwest. This spot is magnetically very complex and is the most significant on the visible disc as it approaches the southwest limb. There are six other sunspot regions on the visible disc. One is a moderately sized spot, with complex magnetic configuration, in the southern hemisphere near centre disc. Most remaining regions on the disc are relatively small, weak and magnetically simple, showing little or no development. No Earth-directed Coronal Mass Ejections are currently in the forecast given available imagery.

**Solar Wind / Geomagnetic Activity:** Solar winds have been at Low levels throughout. The total Interplanetary Magnetic Field was weak. The north-south component fluctuated, but was occasionally weakly negative. Geomagnetic activity was Quiet (Kp 0-2).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) has persisted at background with no solar radiation storms observed.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Solar activity is likely to continue at Moderate levels, with further Moderate flares likely especially from the active sunspot in the southwest. There is a slight chance of rising to High with the potential for an isolated maximum Strong flare.

**Solar Wind / Geomagnetic Activity:** There are currently no Earth-directed CMEs. A CME analysed from the 14th has a slight chance of giving a glancing interaction with Earth on day 3 (18th). Solar winds continuing at Low levels until around day 3 (18th), when the arrival of fast winds from a coronal hole could occur. Quiet geomagnetic activity is expected, with a chance of Unsettled to Active intervals around day 3 (18th).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is likely to persist at background, however this has a slight chance of rising in response to any notable flares that occur, perhaps exceeding the S1/Minor Storm level.

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# Met Office Space Weather Forecast

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 1 | 1 | 10 | 1 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 70 | 70 | 40 | 40 |
| Very Active | R3 to R5 X | No | 15 | 15 | 5 | 5 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 10 | 5 | 5 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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